

30 June 2005

IAP6 Rec'd PCT/PTO 15 DEC 2005

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REPLY TO WRITTEN OPINION
INTERNATIONAL PATENT APPLICATION PCT/FI2003/000573
APPLICANT: NOKIA CORPORATION
DUE DATE: 10 JULY 2005

Dear Sirs,

On account of the Written Opinion issued on 11 May 2005 we submit the following:

The Written Opinion (WO) refers to document D1 WO99/48312A1. According the WO claim 29 is not new in view of D1, and claims 29-39 do not include an inventive step.

In order to make independent claim 29 to correspond more precisely with the invention described in the present application claim 29 has been amended. The amended claim 29 states that a first network unit comprises means for communicating information with a second network unit via a satellite, and the arrangement is characterised in that the arrangement comprises means for emulating signalling of the second network unit for the first network unit during periods when there is no communication via the satellite between the first network unit and the second network unit. The emulation is capable of providing required state signalling without a connection between the base station and the base station controller, and therefore the satellite communication link can be switched to off state when it is not needed for transferring calls or other information.

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Dependent claim 31 that is redundant with the amended claim 29 has been removed.

The amended set of claims is attached **AP20 Rec'd PCT/NO 16 DEC 2005**

Revisions corresponding with the amendments in claim 29 have been done in the specification p. 5 r. 28 – p. 6 r. 4. The amended pages 5 and 6 of the specification are attached.

Document D1 (p. 3 r. 32 – p. 4 r. 8) presents an arrangement wherein a mobile communication network is arranged to comprise a mobile station emulator that looks like a mobile station to the mobile communication network. This arrangement makes it possible for a user to access the mobile communication network using a simple signalling e.g. Bluetooth instead of using a mobile communication protocol signalling e.g. GSM.

An emulator for emulating signalling in order to make possible to switch a satellite link to off-state is a different thing than a mobile station emulator allowing access with a simple signalling protocol. Therefore, document D1 does not constitute an obstacle for novelty and an inventive step for claims 29-38 in the amended set of claims.

Yours faithfully,
BERGGREN OY AB

Matti Brax
Patent Agent

ENCLS: Amended pages 5 and 6
Amended set of claims

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In accordance with the invention there is also provided a communication method for communication between a first network unit inside a vehicle and a second network unit of a terrestrial mobile communication system, wherein said communication is directed via a satellite, the method being characterized in that the method comprises:

- establishing the satellite connection when information transfer between the first network unit and the second network unit is required,
- releasing the satellite connection when information transfer between the first network unit and the second network unit is not required,
- emulating signalling of the second network unit for the first network unit during a released state of the satellite connection, and
- emulating signalling of the first network unit for the second network unit during the released state of the satellite connection.

In accordance with the invention there is also provided a communication arrangement comprising a first network unit for wireless communication with mobile stations inside a vehicle and a fixed second network unit of a terrestrial mobile communication system, the system comprising means for communicating between the first network unit and the second network unit via a satellite, the arrangement being characterized in that the arrangement further comprises

- means for establishing the satellite connection when information transfer between the first network unit and the second network unit is required,
- means for releasing the satellite connection when information transfer between the first network unit and the second network unit is not required,
- means for emulating signalling of the second network unit for the first network unit during a released state of the satellite connection, and
- means for emulating signalling of the first network unit for the second network unit during the released state of the satellite connection.

The invention further relates to a first network unit arrangement for wireless communication with mobile stations inside a vehicle and a fixed second network unit of a terrestrial mobile communication system, the first network unit comprising means for communicating information with a second network unit via a satellite, the ar-

range being characterised in that the arrangement comprises means for emulating signalling of the second network unit for the first network unit during periods when there is no communication via the satellite between the first network unit and the second network unit.

- 5 Some preferred embodiments of the invention are described in dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the invention will be described in detail below, by way of example only, with reference to the accompanying drawings, of which

- 10 Figure 1a shows an embodiment of the wireless communication system according to the invention,

Figure 1b shows an embodiment of a base station including an emulator according to the invention,

Figure 1c shows an embodiment of a base station controller including an emulator according to the invention,

- 15 Figure 2 shows a flow diagram of an exemplary method according to the invention for controlling satellite communication and providing state signalling,

Figure 3 shows providing call related signalling in an exemplary arrangement according to the invention,

- 20 Figure 4 shows providing operating and maintenance related signalling in an exemplary arrangement according to the invention,

Figure 5a shows a second exemplary arrangement for providing call and packet data transmission, wherein packet data is transferred directly via satellite land station and Internet,

- 25 Figure 5b shows a third exemplary arrangement for providing call and packet data transmission, wherein call data and packet data are both transferred using IP protocol, and

Figure 6 shows an exemplary arrangement according to the invention for providing handovers between several satellites and related terrestrial networks.

DETAILED DESCRIPTION

Claims

1. A communication method for communication between a first network unit inside a vehicle and a second network unit of a terrestrial mobile communication system, wherein said communication is directed via a satellite, **characterized in**
5 that the method comprises:
 - establishing the satellite connection when information transfer between the first network unit and the second network unit is required,
 - releasing the satellite connection when information transfer between the first network unit and the second network unit is not required,
 - 10 - emulating signalling of the second network unit for the first network unit during a released state of the satellite connection, and
 - emulating signalling of the first network unit for the second network unit during the released state of the satellite connection.
2. A communication method according to claim 1, **characterized in** that said
15 signalling is LAPD link and Abis signalling.
3. A communication method according to claim 1, **characterized in** that said emulating signalling of the second network unit comprises transferring state messages with the first network unit.
4. A communication method according to claim 1, **characterized in** that said
20 emulating signalling of the first network unit comprises transferring state messages with the second network unit.
5. A communication method according to claim 2, **characterized in** that during the on state of the satellite connection capacity is reserved dynamically for the Abis link, based on the data transfer requirement.
- 25 6. A communication method according to claim 1, **characterized in** that additional data according to Internet Protocol (IP) is transferred between the first network unit and Internet via the satellite, wherein the communication between the first network unit and the second network unit is prioritized higher in the satellite communication than the IP data transferred between the first network unit and the Internet.
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7. A communication method according to claim 5, **characterized** in that the data transferred between the first network unit and the second network unit is transferred as packet data according to Internet Protocol.
8. A communication method according to claim 1, wherein the vehicle is an aircraft, **characterized** in that the method comprises receiving flight status information from the avionics of the aircraft for controlling the first network unit.
9. A communication method according to claim 8, **characterized** in that said on the basis of the received flight status information communications between the first network unit and mobile stations inside the aircraft are barred while keeping mobile stations camped to the first network unit.
10. A communication method according to claim 8, **characterized** in that the flight status information comprises at least one of the following information: flight altitude, position and heading, doors open/closed, activate/deactivate mobile communications.
11. A communication method according to claim 1, **characterized** in that the method comprises steps for:
- receiving communication information on another satellite and another second network unit,
 - establishing communications between the first network unit and the other second network unit via the other satellite on the basis of the received communication information, and
 - releasing the communication between the first network unit and the second network unit via the satellite.
12. A communication method according to claim 1, **characterized** in that the information transfer is compliant with at least one of the following communication specifications: GSM, PCN, PCS, HSCSD, GPRS, EDGE, CDMA, WCDMA, Bluetooth, UMTS, Teldesic, Iridium, Inmarsat and WLAN.
13. A communication method according to claim 1, **characterized** in that a wireless connection between the mobile terminal and the first network device is established by a wireless network inside the vehicle.

14. A communication arrangement comprising a first network unit for wireless communication with mobile stations inside a vehicle and a fixed second network unit of a terrestrial mobile communication system, the system comprising means for communicating between the first network unit and the second network unit via a satellite, **characterized** in that the arrangement further comprises

- means for establishing the satellite connection when information transfer between the first network unit and the second network unit is required,

- means for releasing the satellite connection when information transfer between the first network unit and the second network unit is not required,

10 - means for emulating signalling of the second network unit for the first network unit during a released state of the satellite connection, and

- means for emulating signalling of the first network unit for the second network unit during the released state of the satellite connection.

15. A communication arrangement according to claim 14, **characterized** in that said signalling is LAPD link and Abis signalling.

16. A communication arrangement according to claim 14, **characterized** in that said means emulating signalling of the second network unit comprises means for transferring state messages with the first network unit.

17. A communication arrangement according to claim 14, **characterized** in that said means for emulating signalling of the base station comprises means for transferring state messages with the base station controller.

18. A communication arrangement according to claim 15, **characterized** in said means for emulating are arranged to reserve capacity during the on state of the satellite connection dynamically for the Abis link, based on the data transfer requirement.

19. A communication arrangement according to claim 14, **characterized** in that it comprises means for transferring additional data according to Internet Protocol (IP) the first network unit and Internet via the satellite, wherein the communication between the first network unit and the second network unit is prioritized higher in the satellite communication than the IP data transferred between the first network unit and the Internet.

20. A communication arrangement according to claim 19, **characterized** in that it comprises means for transferring data between the first network unit and the second network unit as packet data according to Internet Protocol.
21. A communication arrangement according to claim 12, **characterized** in that
5 the vehicle is an aircraft.
22. A communication arrangement according to claim 21, **characterized** in that it comprises means for receiving flight status information from the aircraft for controlling the first network unit.
23. A communication arrangement according to claim 22, **characterized** in that the
10 arrangement comprises means for barring communications between the first network unit and mobile stations inside the aircraft on the basis of the received flight status information, and means for keeping the mobile stations camped to the first network unit during the barred state.
24. A communication arrangement according to claim 22, **characterized** in that
15 the flight status information comprises at least one of the following information: flight altitude, position and heading, doors open/closed, activate/deactivate mobile communications.
25. A communication arrangement according to claim 14, **characterized** in that the arrangement comprises:
- 20 - means for receiving communication information on another satellite and another second network unit,
- means for establishing communications between the first network unit and the other second network unit via the other satellite on the basis of the received communication information, and
- 25 - means for releasing the communication between the first network unit and the second network unit via the satellite.
26. A communication arrangement according to claim 14, **characterized** in that the information transfer is compliant with at least one of the following communication specifications: GSM, PCN, PCS, HSCSD, GPRS, EDGE, CDMA, WCDMA,
30 Bluetooth, UMTS, Teldesic, Iridium, Inmarsat and WLAN.

27. A communication arrangement according to claim 14, **characterized** in that the first network unit is a base transceiver station and the second network unit is a base station controller.

28. A communication arrangement according to claim 14, **characterized** in that it comprises a wireless network inside the vehicle for wireless connection between a mobile terminal and the first network device.

29. A first network unit arrangement for wireless communication with mobile stations inside a vehicle and a fixed second network unit of a terrestrial mobile communication system, the first network unit comprising means for communicating information with the second network unit via a satellite, **characterised** in that the arrangement comprises means for emulating signalling of the second network unit for the first network unit during periods when there is no communication via the satellite between the first network unit and the second network unit.

30. A first network unit arrangement according to claim 29, **characterized** in that said signalling is LAPD link and Abis signalling.

31. A first network unit arrangement according to claim 29, **characterised** in that the first network unit is a base transceiver station and the second network unit is a base station controller.

32. A first network unit arrangement according to claim 29, **characterized** in said means for emulating are arranged to reserve capacity during the on state of the satellite connection dynamically for the Abis link, based on the data transfer requirement.

33. A first network unit arrangement according to claim 29, **characterized** in that it is located in a moving vehicle, such as aircraft.

34. A first network unit arrangement according to claim 33, **characterized** in that it comprises:

- means for receiving communication information on another satellite and another second network unit,

- means for establishing communications between the first network unit and the other second network unit via the other satellite on the basis of the received communication information, and

- means for releasing the communication between the first network unit and the second network unit via the satellite.

35. A first network unit arrangement according to claim 33, **characterized** in that the vehicle is an aircraft that the first network unit arrangement comprises means for receiving flight status information from the aircraft for controlling the first network unit.

36. A first network unit arrangement according to claim 35, **characterized** in that the arrangement comprises means for barring communications between the first network unit and mobile stations inside the aircraft on the basis of the received flight status information, and means for keeping the mobile stations camped to the first network unit during the barred state.

37. A communication arrangement according to claim 35, **characterized** in that the flight status information comprises at least one of the following information: flight altitude, position and heading, doors open/closed, activate/deactivate mobile communications.

38. A first network unit arrangement according to claim 29, **characterised** in that the first network unit is a base station controller and the second network unit is a base transceiver station.